

MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
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SRM Number: 2696
MSDS Number: 2696
SRM Name: Silica Fume
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SECTION I. MATERIAL IDENTIFICATION

Material Name: Silica Fume

Description: SRM 2696 is intended primarily for use in evaluating chemical and instrumental methods of analysis for silica fume. A unit of 2696 consists of a single bottle containing approximately 70 grams of powder.

Other Designations: Silica Fume (silica; amorphous silica; condensed silica fume; microsilica; silicon dioxide)

Name	Chemical Formula	CAS Registry Number
Silicon Dioxide Amorphous	SiO ₂	69012-64-2
Silicon Dioxide Crystalline	SiO ₂	14808-60-7

DOT Classification: Not Applicable

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Component	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Silicon Dioxide Amorphous	≈95	ACGIH TWA: 2 mg/m ³ (respirable particulate)
Silicon Dioxide Crystalline	<0.5	ACGIH TWA: 0.05 mg/m ³ (respirable fraction)
		NIOSH TWA: 0.05 mg/m ³ /10 h (respirable particulate)
Mineral Dust	balance	no occupational exposure limits established

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Silica Fume
Appearance and Odor: odorless, light to dark gray ultrafine amorphous powder
Particle Size (μm): 0.5
Relative Molecular Mass: ≈60.1
Melting Point (°C): 1230
Specific Gravity (water=1): 2.2 – 2.3
Solvent Solubility : soluble in hydrofluoric acid
Water Solubility (@ 15 °C): insoluble

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable Method Used: Not Applicable Autoignition Temperature: Not Applicable

Flammability Limits in Air (Volume %):

UPPER:	Not Applicable
LOWER:	Not Applicable

Unusual Fire and Explosion Hazards: Microsilica is not combustible and the dust presents no danger of explosion.

Extinguishing Media: Use extinguishing media appropriate to the surrounding fire.

SECTION V. REACTIVITY DATA

Stability:	X	Stable	Unstable
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Stable at normal temperature and pressure.

Conditions to Avoid: Avoid contact with hydrofluoric acid and fluorides. Avoid generating dust.

Incompatibility (Materials to Avoid): Microsilica reacts with hydrofluoric acid (HF) forming toxic silicon fluoride gas (SiF_4).

Hazardous Decomposition or Byproducts: Thermal decomposition of microsilica above 500 °C will convert amorphous silica to crystalline byproducts which may cause silicosis.

Hazardous Polymerization	Will Occur	X	Will Not Occur
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SECTION VI. HEALTH HAZARD DATA

Route of Entry: X Inhalation X Skin X Ingestion

Health Hazards (Acute and Chronic): Microsilica may contain trace elements (<0.5 %) of crystalline silica, which has been shown to cause silicosis and has been identified as a possible human carcinogen.

NOTE: Ensure adequate ventilation when handling this material, and wear an appropriate particulate respirator in accordance with CFR 1910.134 or CSA Standard Z94.4 –M1982 for dust exposure that may exceed exposure limits. If adequate ventilation is not possible, a self contained breathing apparatus (SCBA) or an air supplied respirator is recommended.

Medical Conditions Generally Aggravated by Exposure: Not Established

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	<u>X</u>	<u> </u>
In the International Agency for Research on Cancer (IARC) Monographs	<u>X</u>	<u> </u>
By the Occupational Safety and Health Administration (OSHA)	<u>X</u>	<u> </u>

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance immediately.

Inhalation: If adverse effects occur, move the victim to fresh air. If respiratory irritation, nausea, dizziness, or unconsciousness occurs, seek immediate medical assistance. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration by qualified personnel.

Ingestion: If ingested, seek immediate medical attention.

TARGET ORGAN(S) OF ATTACK: None reported.

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released: Avoid generating dust. Collect spilled material in appropriate container for disposal in accordance with current applicable laws and regulations. Clean up residue with a high-efficiency particulate filter vacuum. Keep out of water supplies and sewers.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Store and handle in accordance with all current regulations and standards. Wear appropriate personal protective equipment. Keep containers tightly closed when not in use. Keep separated from incompatible substances. Approved respiratory protective equipment must be used when dust concentrations exceed applicable standards. An eye wash station and washing facilities should be readily available near handling and use areas.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Amorphous Silica Fume*, 19 March 2003.
MDL Information Systems, Inc., MSDS *Quartz*, 19 March 2003.
Elkem Materials Inc., MSDS *Microsilica*, 22 June 2000.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.